



*Rewarding Learning*

**General Certificate of Secondary Education  
2012–2013**

---

**Double Award Science: Chemistry**

Unit C1

Foundation Tier

**[GSD21]**

**MONDAY 20 MAY 2013, AFTERNOON**

---

**MARK  
SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes


Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

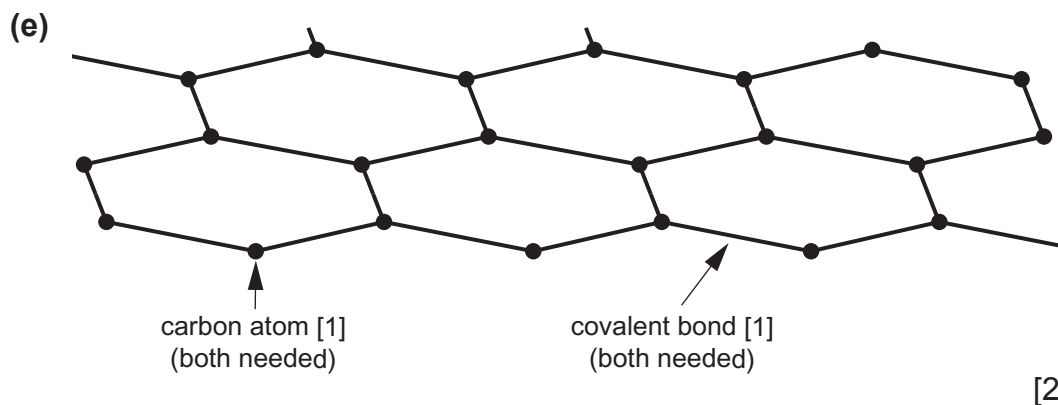
The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

			AVAILABLE MARKS	
1	(a)	idea of eye-catching/can be understood by people who cannot read/can be understood by people who cannot speak language/internationally agreed <i>any 2</i> (not to warn of danger)	[2]	
	(b)	(i) C		
		(ii) D	[2]	
	(c)		[1]	5
2	(a)	any pH in range 3–6 [1] dark green [1] any pH in range 12–14 [1] (accept blue–green)	[3]	
	(b)	(i) Lemon juice	[1]	
		(ii) Baking soda	[1]	5
3	(a)	halogens	[1]	
	(b)	dark grey [1] solid [1]	[2]	
	(c)	I <sub>2</sub> <b>not</b> I <sup>2</sup> <b>not</b> I <sub>2</sub>	[1]	
	(d)	Sodium iodide [1] NaI [1]	[2]	6
4	(a)	A filter funnel [1] <b>not</b> filter <b>not</b> funnel B conical flask [1] <b>not</b> flask C evaporating dish [1] allow evaporating basin	[3]	
	(b)	Candidates draw an arrow to the liquid in the conical flask and label it the filtrate [1] Candidates draw an arrow to the solid in the filter paper in the filter funnel and label it the residue [1]	[2]	
	(c)	Bunsen burner or other suitable named apparatus e.g. hot plate	[1]	
	(d)	Copper(II) sulfate is soluble in water	[1]	7

			AVAILABLE MARKS	
5	(a)	The temperature [1] at which a solid changes to a liquid [1]	[2]	5
	(b)	B and C (both needed)	[1]	
	(c)	gas	[1]	
	(d)	sublimation	[1]	
6	(a)	(i) Palladium	[1]	6
		(ii) $\text{Al}^{3+}$	[1]	
		(iii) Aluminium sulfate	[1]	
		(iv) 1 calcium, 2 hydroxide ions	[1]	
	(b)	$\text{Na}_2\text{O} + 2\text{HCl} \longrightarrow 2\text{NaCl} + \text{H}_2\text{O}$ <div style="display: flex; justify-content: space-around; width: 100%;"> <span>[1]</span> <span>[1]</span> </div>	[2]	
7	(a)	protons [1] electrons [1] shells [1] in this order	[3]	7
	(b)	protons	[1]	
	(c)	it has 16 neutrons or idea that it has 31 protons and/plus neutrons	[1]	
	(d)	(i) $\text{PH}_3$ <b>not</b> $\text{PH}^3$ , <b>not</b> $\text{PH}_3$ , <b>not</b> $\text{pH}_3$	[1]	
		(ii) covalent	[1]	

- 8 (a) Different forms of the same element in the same physical state [1]
- (b) It contains **only** carbon atoms/It contains one type of atom  
Idea that it is a form of (the element) carbon [1]
- (c) It is a (good) conductor of electricity [1] it is a (good) conductor of heat [1]  
Allow [1] for (good) conductor on its own [2]
- (d) Carbon is a non-metallic element/It is transparent/it has covalent bonds/idea of extremely high melting point. *Any* ( $2 \times [1]$ )  
**not** It is an allotrope of carbon [2]



- (f) Candidates choose a property of graphene from the passage and gain a mark for an associated use. Candidates may suggest common uses for the property e.g. used in construction, linked to strength as steel or a futuristic use. [1]

- 9 (a) Under oil [1]
- (b) Idea that a large piece could pose a danger or idea that sodium is very reactive [1]
- (c) Idea of causing burning/being corrosive (to skin) [1]; idea of reacting with moisture on skin [1]  
Idea that using tongs prevents this [1] any ( $2 \times [1]$ ) [2]
- (d) Moves quickly across the surface of the water [1] melts into a silvery ball [1] eventually disappears [1] [3]
- (e) Group 1 allow alkali metals. [1]

AVAILABLE  
MARKS

9

8

10 (a) Candidates draw a magnesium atom with an electronic configuration 2,8,2 [1] and a chlorine atom with the electronic configuration 2,8,7 [1]  
[2]

(b) Indicative content

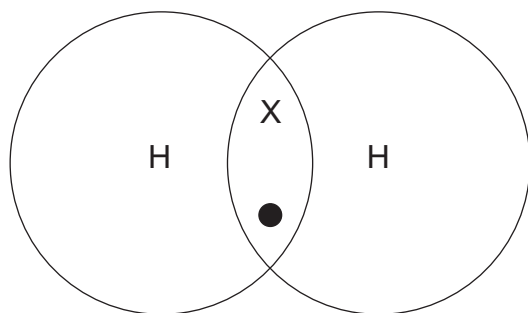
- Idea of electron transfer from magnesium to chlorine
- Magnesium loses 2 electrons
- To 2 chlorine atoms/forms  $\text{MgCl}_2$
- To become a magnesium ion with a charge of  $2+$  /to form  $\text{Mg}^{2+}$
- Each chlorine atom gains one electron
- To become a chloride ion with a charge of  $1-$  /to become  $\text{Cl}^-$
- The ions are held together by electrostatic forces/oppositely charged ions are attracted

Response	Mark
Candidates make correct reference to 6–7 of the indicative points shown. They use good spelling, punctuation and grammar and the form and style are of a high standard.	5–6
Candidates make correct reference to 4–5 of the indicative points shown. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4
Candidates make correct reference to 1–3 of the indicative points shown using limited spelling, punctuation and grammar. The form and style is of limited standard and they have made no use of specialist terms.	1–2
Candidates make no reference to the main points above and offer no other suitable response.	0

[6]

AVAILABLE  
MARKS

- (c) Molecule must be H<sub>2</sub> for any credit [2]  
 Correct sharing, dot and cross, correct total electrons [2]  
 Correct sharing, dot and cross, incorrect total electrons [1]  
 Correct sharing, not dot and cross, correct total electrons [1]  
 Correct total electrons is dependent on correct sharing.



- (d) Apply a lighted splint [1] a popping sound is heard if hydrogen is present [1]

[2]

AVAILABLE  
MARKS

[2]

12

**Total**

**70**